

Defeat hall should be large enough to be planted in hollow of os maxilla not press the back & lat dorsi muscles into spasmodic contraction
ON THE

METHODS OF ACQUIRING KNOWLEDGE.

*Pelletan Clinique Chirurgicale -
Case report of Defeat of os maxilla -
of Chamberlain - Pelletan -*

INTRODUCTORY LECTURE

*Disproportion - Operation for Defeat of os maxilla -
supported from when patient had nearly died*
TO THE COURSE OF

THE INSTITUTES OF MEDICINE,

FOR THE SESSION 1838-39:

DELIVERED IN THE

UNIVERSITY OF PENNSYLVANIA,

NOVEMBER 6, 1838.



BY SAMUEL JACKSON, M. D.

PHILADELPHIA:

J. G. AUNER, 331 MARKET STREET.

PRINTED BY L. R. BAILEY, 26 NORTH FIFTH STREET.
1838.

HMD
ALPHA
BOX
C.2



Harvey best views on generation

DeSaill's found very little force necessary in many simple cases of luxation of shoulder -

CORRESPONDENCE.

Dr. Phillips
Philadelphia, November 21st, 1838.

PROFESSOR SAMUEL JACKSON,

DEAR SIR.—We, the undersigned, a Committee appointed in behalf of the Medical Class of the University of Pennsylvania, to request of you for publication, a copy of your highly appropriate and eloquent Introductory Lecture, take great pleasure in the performance of this trust.

Hoping that you will comply with our request, we are, with sentiments of esteem,

Respectfully, your's,

H. RIDGELY,
WILLIAM A. HILL,
THOMAS SAPPINGTON,
B. BARDWELL,
A. W. READ,
THOMAS J. P. STOKES,
LUCAS GEE.

Philadelphia, December 1st, 1838.

TO MESSRS. H. RIDGELY, WILLIAM A. HILL, THOMAS SAPPINGTON,
B. BARDWELL, A. W. READ, THOMAS J. P. STOKES, LUCAS GEE:

GENTLEMEN.—I have delayed an answer to your polite note of the 21st, requesting, on the part of the Medical Class, my Introductory Lecture for publication, from an indisposition to part with the present Lecture, but rather to retain it as a standing Introductory, to which the subject appears to me to be appropriate. It is difficult, I find, to refuse the request of so respectable a body of gentlemen as the present Class of the University. I have finally decided to place it at their disposal.

I beg you to convey to the Class my most respectful sentiments, and accept for yourselves the esteem of

Your's, &c.,

SAMUEL JACKSON, M. D.

CORRESPONDENCE

THE NEW YORK PUBLIC LIBRARY

ASTOR LENOX TILDEN FOUNDATION
1215 Broadway, New York City
Telephone: BR 3-2121

For information regarding the Library, please write to the Librarian.

For information regarding the Library, please write to the Librarian.

For information regarding the Library, please write to the Librarian.

For information regarding the Library, please write to the Librarian.

For information regarding the Library, please write to the Librarian.

For information regarding the Library, please write to the Librarian.

INTRODUCTORY LECTURE.

GENTLEMEN—

UNCERTAINTY is a painful condition of the mind. While it prevails, there can be no decision in conduct, or perseverance in action. Vacillation and doubt give a consciousness of weakness and inferiority. The mind finds a refuge from this state in fixed convictions, however acquired, or in the adoption of positive ideas. They are to the operations of the understanding, what a firm footing is to the movements of the body.

This painfulness of mental suspense is experienced in the feverish anxiety and irritation felt, when, in journeying in an unknown quarter, the road unexpectedly divides into different routes, without an indication as to the direction leading to the place, where shelter and repose, are to be found.

The confidence and energy inspired by unshaken convictions, though they may be narrow and erroneous, are to be preferred to the palsied feebleness resulting from vacuity of ideas, and incapacity to form settled opinions. The mischiefs of error do not surpass those of indecision and delay; while from force of character we may anticipate the perception and adoption of truth, a circumstance it would be hopeless to look for from imbecility. A single idea, enthusiastically entertained and constantly acted on, has made a hero, and governed mankind. A cyclopædia of knowledge, stored in the memory, without the temperament to enforce convictions, has not saved from the stigma of folly.

Every individual, with a species of mental instinct, is led to the formation of positive determinations in the kind of know-

ledge he does possess. He endeavours to obtain a power and fixedness of purpose in the transactions of life; he avoids the necessity of endless deliberation, by acquiring positive ideas and absolute convictions, which, to him, will be invariable rules and guides of conduct.

The results of this action of the mind, are as various and diversified as the innate differences of individuals. For the most part, the ideas and knowledge that compose our convictions, are formed into circles of varying dimensions, regulated by our intellectual and moral capabilities, and opportunities of information.

In the great mass of mankind, probably inseparable from the present social condition, the circle is narrow and confined. Once formed, it is too often hermetically closed. New ideas cannot be admitted; no new fact can be recognised; no demonstration be listened to. This circle of ideas is to them, the extent of God's universe. Such individuals possess firm convictions; they are harrassed by no doubts; they are pertinacious in their opinions; fanatical, dogmatic, and contentious. They exhibit what Carlyle calls, "the completeness of limited men."

Another class, with higher endowments and superior opportunities, possesses expanded circles, embracing extended and varied knowledge, capable of enlarging for the admission of new ideas and truths, unfolded with the progress of science. Such men are liberal in their opinions; tolerant of opposition; they labour to advance civilization and social happiness; they are the recipients and teachers of knowledge.

To a chosen few of our race, is given the great privilege of an intellectual range, confined by no artificial limits. Their region is the empyrean of truth. With struggles of deep thought they penetrate to the truths hidden from eternity in the womb of time, waiting their birth-time. They bring them forth, and their influence is felt in the destinies of mankind. These men are the pillars of fire, leading the march of science, and progress of knowledge, advancing into the dark, unexplored regions of the unknown.

The methods by which ideas are acquired, opinions and con-

victions are formed, are various. They differ materially, and, as they exercise a most controlling power over the justness of our thoughts, and the genuineness of our knowledge, it will be proper to examine these operations of the mind, as important in regulating the numerous subjects of inquiry, that will occupy us in the ensuing course of lectures.

I. The first of these methods is authority, or the confidence reposed in the truth of the convictions, opinions, or facts related by another. For a knowledge of the past, the absent, or what we cannot ourselves perform, we must rely on authority. The influence of authority is derived from that action of the mind denominated faith, the expression of the innate sense of truth, existing within ourselves. We feel a consciousness, that without some powerful motive of interest to corrupt and sway our minds, it is impossible we should commit deliberate falsehood; or, that from mere wantonness of purpose, we should invent or father a lie, certain to be detected and exposed, and have infamy stamped on our name. What we are conscious of in ourselves, we believe to exist in others. When, then, we find individuals publishing and proclaiming as the result of their own personal knowledge, or of their investigations, certain facts, events, or opinions; if there be nothing contrary to our own or universal experience; no gross violation of probability, we adopt their convictions, and rely upon them as authority for the truth of what we have not the means, opportunity, or inclination to observe or to investigate for ourselves.

Authority may be referred to for opinions or for facts. In all the moral sciences—metaphysics, theology, law—opinions are the most important subjects settled by authority. In the physical sciences, facts are its chief subjects. The physiological sciences place both facts and opinions under its decision.

From the necessity of the thing, most of our knowledge must be based on authority. The past, that cannot be re-enacted; the distant that cannot be observed; the difficult, that our means and capability of observation shut out from our power of direct knowledge, must be known to us only from authority. But, as authority is nothing more than individual convictions, it is liable

to all the fallacies that attend on human judgments. Too much reliance is not to be placed on authority. It is wholesome to look on it with a jealous eye ; to inquire into its pretensions ; to investigate its decisions ; and ascertain the ground on which they rest.

Opinions are arrived at by a process of reasoning ; and, when authority has reference to opinions, the method of reasoning by which they were formed should be communicated, that we may judge of its soundness and strength.

Experiment, observation, investigation establish facts ; and when they are to be received on authority, the processes and means by which they have been determined, should be explained. They can then be verified by repetition, or their adequacy to sustain the facts can be appreciated. A single authority should seldom be trusted to with unqualified faith. In impeaching authority, the question is not one of veracity, but of capability. It is not a suspicion of mendacity that is entertained, but, that the individual may not have been sufficiently guarded against the numerous sources of deception, that surround and embarrass every subject of investigation. Very honestly, may the appearance of truth be mistaken for truth itself.

When numerous, unconnected authorities, in distant periods and in different countries, by observations and investigations original with themselves, arrive at the same conclusions, we have strong confirmative proof, that the authority is an enunciation of a truth. It may be received as such.

We must not suffer ourselves to be imposed on merely by consonance of authorities, however numerous or respectable, when they merely repeat one another, or draw from some common authority, as an oracular source, which they merely reiterate. That which is false in itself, though repeated by millions of tongues, and believed through ages, cannot become true.

The authority of Galen gave vogue to doctrines which were commented on and reproduced in every variety of shape, for more than a thousand years, by an immense host of authors. Volumes on volumes were written, but they added nothing ori-

ginal. There was no exploring of phenomena as existing in nature; facts were not observed and examined to know them, as they are, but, as they were represented and explained by the oracle. Now, as these doctrines were mere brain-born hypotheses, so little force did they acquire by this host of writers and commentators, that as soon as they were brought to face natural phenomena and be contrasted with them, though by a gross empiric, they shrunk into insignificance, and vanished into mere nothingness. Such must be the end of the false.

In proportion to the narrowness of ideas, and the limited range of knowledge, in a community, is the reverence felt for authority, and the submission to its dictates. Authority has ruled, and, probably, always will continue to rule the world. Creeds, formulas, phrases, emanating from some authority, in religion, in government, in politics, in party factions, in social relations, in medical and in other sciences, have been the instruments of rule, as one mind must ever rule over many. They have been adopted as infallible truths, believed with so deep a conviction, as to become a part of existence. Man sooner parts with life, than parts with what his mind has lived on as its daily food; with what his soul has clung to with the strong devotion of eternal truth. It is by these instruments, that the intellectual power of one mind, for good or for ill, chains up the intellect of the masses, or impels and guides it into action. Make of it what we may, in every body of men brought together, there must be one who is the master-spirit, and, he soon, for the time, becomes the ruler over men. Without the contrivances spoken of, the masses, with no other than physical or organic instinctive motives to action, would languish in the deadness of inertia, or, incapable of common principles of action, each striving for himself, society become a

" Universal hubbub wild
Of stunning sounds, and voices all confused,
Borne through the hollow dark
With loudest vehemence."

Authority with all its defects, its liability to the propagation and perpetuity of error, must, then, be the principal source from which we draw a large portion of our knowledge.

The defects pertaining to authority may be counteracted by extending the sphere of general knowledge, by a cultivation of the positive sciences, and the disciplining of the mind by the rules of a severe logic. No mind, imbued with science based on principles, and versed in the spirit of a just philosophy, will ever regard as authority, any one, who does not explain the grounds of his convictions; who does not spread out the proofs of reasoning by which they were formed; who does not sustain his assertions, by the evidence of demonstration and facts. Such a mind can admit of no oracle, with self-intuition, propounding principles and facts for implicit belief. Yet, in our time, sects in religion, politics, and in medicine, have appeared, and continue to arise, having no other origin, than the unsustained and bold assertions of one man. The ignorant and the feeble, unable to question, to canvass, and decide on such pretensions, quail before them; while it is to be feared, the interested and selfish, sacrifice truth and principle at the shrine of gain.

II. The second source of our knowledge is testimony. Testimony is individual evidence, to the truth of a fact, derived from observation or experience. Testimony is not less imperfect than authority. It is even more vitiated by the causes productive of error and untruth. It is seldom that testimony, though most conscientious, can be received without the closest scrutiny. It is not that we distrust testimony from a suspicion of intentional deception, but, few can guard against self-deception, by which testimony is rendered false.

The sources of error in testimony belong to the individual who gives it, and to circumstances that are extraneous. In the individual, the greater or less activity of the senses, and perceptive faculties, will impart greater or less accuracy to observation and to the value of testimony. A man with dulness of vision, or any other sense, will be struck only by the grosser features of an object. All the nice, discriminating shades and outlines are lost to him. His testimony, from the natural deficiencies of his senses, will give statements the reverse of the truth, and differ totally from the testimony of one with acute

senses, who detects all the characters of the subject of observation.

The differences in the acuteness of perception and the activity of the knowing faculties, will produce entire dissimilitude in the testimony of different persons, as to the same thing or occurrence. There are some whose perceptions are so dull, that they do not observe what is taking place around them, or note the objects or scenes they pass by. They cannot recal any circumstance, or any particular of what has just come under their view. There are others, again, whom nothing escapes. Without apparently paying particular attention, every thing, even the minutest, is observed and remembered. Sir Walter Scott was a striking instance of this vivacity of perception. He invented less than he recollected. His descriptions of scenery and of character, are realities; the one, drawn from nature, of the places he had visited; the other, portraitures, for the most part, of individuals whom he had met with.

Excitement of the mind, of the imagination, or of the passions and emotions, render objects confused to the perceptions of individuals. They become so distorted, when related, as to bear no resemblance to the original. Hence, in moments of strife and contention; in periods of violence and disorder; different witnesses testify most discordantly to the same facts and events. History must ever contain much that is false, from this cause of defect in the testimony on which it is founded. History has been justly defined, for the most part, "the epitomized synopsis of rumour."

The anecdote related of Sir Walter Raleigh is well known. He witnessed a transaction from a window of the Tower in which he was confined. Several persons testified to the facts of the case, all different from each other, and each from his impressions. He was so struck with this instance of the discrepancy and evident fallacy of testimony, that, losing all confidence in the testimony of history as to the past, when that of the present is so uncertain and so difficult to be known, he destroyed the historical work in which he was engaged at the time.

A source by no means unfrequent, of false testimony, are the

prepossessions, pre-conceived opinions, the self-love and interests of individuals. Under the bias of these feelings, the truth that wounds them, that would convict of long cherished error, that threatens an established interest, is offensive, is resisted pertinaciously, and whatever can tend to obscure it, to prevent its admission, to throw it back from the convictions of others as of ourselves, is eagerly sought for and insisted on. It is too often a failing, not to say a vice, even of great minds, to prefer and contend for the false, on which they have been committed, than to acknowledge they could have been deceived.

From these states of the mind, truth in any department of science has always a birth-struggle for existence, in which it is well should it escape strangulation. It is slow in reaching its maturity, for its advance is by successive generations of men, never by the convictions and conversion of the age in which it comes to light. The generality of men, having once formed their opinions, carry them to their death; all other testimony but that of their own convictions unheeded and disbelieved.

III. A third source of our knowledge, and established systems of belief, are observation and examination. By these operations the mind receives its ideas direct through the action of the senses. It would seem, on a first impression, that this method must be certain, and free of fallacy and deception. Nothing less so. All the causes that corrupt authority and testimony, are combined to deprave observation and examination. The deficiencies in the activity of the senses, the character of the mind, as rapid, hurried, confused, wanting in discrimination and judgments; the prejudices, the pre-conceived opinions that have been formed; are all opposed to correct observation and examination. Besides, it is not, as appears to be a common belief, that, by observation, a phenomenon must be known. So far is this from the truth, that phenomena actually present to the senses are not perceived, or, if noticed, they are misunderstood. To observe accurately an education or discipline, in the best methods of observation and examination, is necessary. Extensive information is not less essential to constitute a close and accurate observer.

Few phenomena are single. Most are compound. There exists in them, properly speaking, elementary phenomena, and as they exhibit several aspects, they are to be studied and observed under each. There may be combined, in the subject of observation, physical, chemical, electrical, inorganic, organic, vital phenomena. Now, to make a correct observation and examination, there must be knowledge sufficient to recognise each phenomenon separately; to place it in its proper category; and to estimate the part it performs, or its true value, in the character or nature of the general phenomenon that is studied.

Hasty, imperfect, and ignorant observation and experiment, have been the most serious obstacles to the progress of science. Medical science has especially suffered from their disastrous influence. False observations, false facts, deceptive experiments, have overloaded the science of medicine, and retarded its advance. A false observation may occupy a short time for its promulgation. But years are required to accumulate the proofs necessary to establish conclusively its falsity.

In the physiological sciences, the phenomena to be observed are more complex, than those of any other department of knowledge. It is this circumstance that renders every thinking mind so distrustful of medical observation; it is this circumstance, that is the cause, in medicine, of the difficulty of avoiding error even with the best intentions and most guarded caution.

From the numerous and diversified phenomena, the subject of investigation, in medical science, the most instructed and most careful observer, can with difficulty, avoid the most serious mistakes, and falling into gross misconceptions. The animal economy, in its healthful condition, exhibits a combination of physical, organic, chemical, and vital phenomena, so intimately blended, that they cannot exist separated from each other. In their combination, they represent, apparently, but a single phenomenon; yet, regarded nearer, and with an instructed eye, this single phenomenon presents different aspects or faces, corresponding to its component elementary phenomena. Its true character can be understood only by breaking it up into its separate parts. But this requires skill and knowledge. It is

not every observer who is competent to undertake it. One who is not familiar with the phenomena in their separate existence, will never recognise them in their combination. His observations must be incorrect and his conclusions false.

In the state of disease, not only are the preceding phenomena present, but they are each modified; they exist in a state, different from that which is natural, and a new series of phenomena enter into the combination. Observation becomes, then, more complicated and difficult; the liability to error is increased in proportion; and a greater degree of caution, a more perfect discipline in the methods of observation, and more extended information, are now demanded on the part of the observer, to guarantee against deception, erroneous impressions, and false judgments.

A perfectly accurate knowledge of phenomena, in medicine, must of necessity be very slowly, and gradually attained. Few individuals are so thoroughly instructed, as to be capable of resolving the general and complicated phenomena of organization and life, in all their varying conditions, into their component phenomena; and then cataloguing them, in their several series. This work, without which a complex whole, cannot be understood, must, in medical science, be executed by different hands. Observations, separately made in different views, or aspects of the same thing, and by different observers, often appear to be in contradiction. It is only after a long period and numberless detached empirical observations, that the analysis is completed, and what was at first supposed to be contradictory, are recognised as merely different parts of one whole. When the analysis has been thus, tediously elaborated, the synthesis of the phenomenon can also be made, and the test thus be applied to the genuineness of the fact.

While medical science was hedged in by close and narrow views; while its facts were seen in a single aspect, it could make but little advance in the direct line of a positive science. It continued to revolve in circles of hypotheses. If it escaped from one, it merely glided into another. The facts of medicine have alternately been explained by the principles of a fictitious

humoralism, by those of a no less fictitious solidism; they have been seen in the light of mechanical, chemical, galvanic phenomena; and been regarded as belonging to an exclusive vitalism, spiritualism, or materialism. This gyratory movement was a necessary result of the knowledge of the age. General science was too little cultivated and known, for enlarged and general views in any particular science, especially where the phenomena are so obscure and complicated as in medicine. Notwithstanding this awkward mode of progression, medicine continued to advance. From each circle it carried with it what in that was true; for there was a body of truth obscurely hidden in a mist-cloud of the false, contained in each one.

Exclusiveness is departing from medicine. The active cultivation and diffusion of general science, have brought, within a few years, a large mass of general knowledge into the ranks of the medical profession. The complex character of the facts of medical science, is more easily and generally appreciated, and the necessity of investigating them with minute attention, and under every aspect, is recognised. The aid of the collateral sciences, in developing the true character of the phenomena of medicine, is no longer repelled with disdain, as superfluous and insufficient. It is invoked as essential to a complete knowledge of them. The recognition of the fact that the phenomena of medicine are of this compound character; that none are simple; that they are all to be examined in the different relations they bear to different sciences, in order to understand them as they are in nature, and not in our artificial systems, has already produced its influence in improving medical observation. It will probably enable medicine to rely on observation, thus strictly conducted, as its most certain means of correct knowledge. Observation will then prove to medicine what it is to the physical sciences, a guide that seldom leads astray.

IV. Experience, another means of establishing opinions, is generally appealed to as an infallible method for the acquirement of accurate knowledge. Its claims to this character cannot be admitted. It has no advantages over other methods, at least, what is usually called experience. Experience, on which

so much stress is laid, is generally the impressions on the mind of an individual, flowing from his personal observation. Now, we have just seen how difficult is correct observation, especially in medicine. Few are qualified to form sound observers. The experience of an individual must, then, depend on his capacity for observation. If he is not gifted with the requisites of an acute and well instructed observer, his experience can have no value. It is a source of delusion. Experience, further, must partake of the intellectual character. If that be hasty, loose, and indefinite, experience possesses all of those defects, and is vitiated.

I have watched, with some attention, persons who have been reputed as experienced, and have prided themselves on their experience. Invariably I have found their experience, as it was termed, consisted in a vague recollection of a limited number of facts, often not more than one, two, or three, on a particular point. These facts had made a strong impression and were retained. Numerous others, by which they were neutralized from a contrary result, were overlooked and forgotten. In consultations, I have remarked, that a single case has been quoted in successive years as justifying a practice, unsuccessful in every instance in which I saw it applied. Yet these hostile results were not permitted to have any weight. The same has occurred with respect to remedies. A particular medicine or preparation has been extolled as adapted to certain symptoms. Employed from this experience, the result was disappointment; yet, subsequently, faith, I found, had not been shaken by these sinister events, and experience was still appealed to in support of the reputed efficacy of the remedy.

That experience, so called, is too frequently nothing more than a loose recollection of unrecorded facts; is strongly illustrated by the following occurrence.

A gentleman, formerly at the head of the profession, was in consultation with an intimate associate in a case of scarlet fever. In support of a treatment he recommended, he stated, that he had never lost a single patient with that disease. His friend, who was well acquainted with the current of his practice, as-

sured him he was mistaken; and enumerated six or seven patients he had lost since the late epidemic had commenced. His surprise was great. The facts had completely escaped his memory. Deception was out of the question. This gentleman was well known for his rigid regard for truth, and to be incapable of deliberate misrepresentation. Now, his supposed experience, on which he relied, in this instance, with so vague a recollection of cases, was evidently fallacious. Yet the experience of most persons, is of this indefinite character.

Another instance of erroneous experience, founded on vague recollection, is furnished by Bouillaud. He asserts that the most frequent alteration of the heart is dilatation, with thinning of the walls of the ventricles. He repeats this assertion after Corvisart; and yet, when an examination was made of cases on record, amounting to one hundred and twenty-five, Bouillaud's and others, but one was found of this character.

Another illustration has lately been furnished, by the statistical results of the mortality of amputations of the extremities. The general impression—that is, experience, on this subject—was, that the mortality was very inconsiderable. But it turns out, when tested by figures, that this operation is attended with the fearful mortality of from twenty-three to twenty-seven per cent. What becomes of the boasted certainty of surgery! Another erroneous impression, or false experience is corrected by these tables. The English surgeons were accustomed to boast how much more successful they were, in amputations, than the French surgeons; and in this country, it was the general opinion, that amputations were less frequently fatal, than in Europe. Now, if these tables are accurate, it appears, that the advantage in favour of the English operators, is little more than one per cent.; while from one to two per cent. is against the surgery of the United States. I may here remark, however, that amputations are less frequently resorted to in this country, than in Europe, and only in cases in which the operation is absolutely indispensable. If the mortality of the operation be greater, yet more limbs are saved in our hospitals, by the perseverance of our surgeons in the treatment of the patients.

It is obvious, from the foregoing remarks, that the value of experience, must depend on the manner in which that experience is gained: the opportunities, the abilities, and the methods of observation of the individual, whose experience is proposed as authority. But, in addition, experience to be relied on should be recorded; all the facts accurately written down at the time when observed. These should be arranged under the various heads to which they belong, and the memory of them be refreshed by a frequent reference to them. And still further; where different methods, or systems of proceeding are applicable, comparisons should be instituted, that the relative worth of each may be verified.

Experience, the common world experience, that every one in his own sphere is relying on, and which we every day hear individuals boast of, is for the most part delusive. It has no higher pretensions to our confidence, as a source of knowledge, than any other of the methods by which knowledge is acquired. The quality of that experience must regulate its value. Few only of the vast multitude, who obtrude their self-termed experience on the world, are endowed with truth-knowledge, as a life-faculty, by which they continue to live among men as authority, undying for successive ages. The rest flare like a little taper, ending in a curl of thin smoke, lost in the great whirlpool of time, and are no more heard of.

V. Among the most useful means of acquiring knowledge and forming our opinions is analysis. Analysis is the art by which the multiple is reduced to the simple, the compound separated into its elements. It has already been said, that nearly all phenomena, though apparently simple, are in reality complex. They cannot be properly known, their true character and relations be understood, until they have been broken up and decomposed into their elementary constituents. This is accomplished by analysis.

The application of analysis, in the modern era, to the physical sciences by Bacon, has given to them the positive character they at present possess. They no longer exhibit subjects involved in refined and intricate hypotheses, or are attended with endless

arguments, ending in no conclusion. Physics are now demonstrated, not argued. The same analytical method is applicable to the intellectual sciences, and will confer on them, to a great extent, the attributes of physics.

Analysis is of two kinds. The one, mental, or accomplished by abstraction; the other, physical, or performed by experiment and demonstration. The first is applicable to the intellectual sciences—to metaphysics, or investigations into man's mind, life and destiny: to law, or the principles best adapted to govern man, in his individual movements, and social relations: to morals, or the examination of the nature, sources, relations, and consequences of human actions: to politics, or the principles of government founded on the social and moral nature of man, and intended to direct the movements of society in its masses, for its protection, and, more especially, for the improved happiness of the greatest possible number.

The great questions embraced in those subjects, which now turn, when discussed, on vague generalities, are capable of having applied to them the analytical method. The truths that lie in them, may be resolved by mental analysis and profound abstraction. It is, then, that our social and political systems and institutions, involving so deeply human interests and happiness, and which prove so inefficient to their great designs, can be more thoroughly understood and perfected, on principles better calculated to accomplish their intentions.

The second, or physical analysis, by experiment and demonstration, is chiefly applicable to the physical sciences. The high state of perfection to which they have been brought, and the triumphs daily accomplished, in the arts, in the conveniences, and business of life, through them, are the results of the analytical method of acquiring knowledge. No synthesis or combination can be effected, unless preceded by analysis, or separation: and any synthesis will be perfect in proportion as the analysis is complete.

In the medical sciences, both methods of analysis are to be brought into application.

Physical analysis, by dissection, has completed special ana-

tomy. Within our own day, it has created general anatomy, and has very nearly rendered it complete. At this moment, carried still further, analytical examination is directed to the minute, or molecular anatomy, and the development of the organs from their first rudiments. Muller has thrown a strong light on this interesting subject. Baër, Treviranus, Raspail, Erdman, Breschet and others, have contributed largely, or are still occupied in this research. Genetic anatomy, or the evolution of the organs and being, from the amorphous organic matter of the embryo, is another modern creation of physical analysis, applied to the physiological sciences; and is cultivated with zeal by Burdach, Carus, Serres, Tiedman, Velpeau, Deschamps, and Breschet. The completion of this branch, will unfold the great law of organic formation; a law which must include within itself, the progression of the movements of life, as manifested in the order of formation. Much of pathological actions, in their inception, most probably rests on this same law, but cannot be seen or understood until the law itself is entirely made out.

Pathological anatomy, the diseased modifications of tissues and organs, and the products of disease, have been, in our time, extensively explored by analysis through autopsial examinations. The materials of a science, are collecting; but they have not yet been worked up into a science. As yet, pathological anatomy has been occupied with the grosser alterations—the last stage of the destructive deterioration of the organs. It has taught us the frequent terminations of neglected or unchecked disease, in structural alteration. It has also settled the value of many symptoms of disease, formerly vaguely comprehended. It is true, by demonstrating their fatal character, our attempts at cure are discouraged; but, at the same time, the patient is saved from harrassing, vain, and often mischievous efforts, to accomplish what is no longer within the reach of human aid.

But it is not from the last degenerated and disorganized condition of the organs, that we can derive a knowledge that will throw light on the nature of those alterations, the causes to which they owe their origin; and thus enable us to cure them, while curable, or to prevent their occurrence. For these objects we

must know the beginning, the first shades that announce the commencing change in the organized structure. Pathological anatomy is now employed like special anatomy, in that which is gross and palpable to the senses. It must follow in the steps of general, molecular, and genetic anatomy, penetrating to the intimate structure, where morbid alterations and productions take their start. The opportunities of surprising nature in this secret work are, it is true, rare; for, as in this state disease is not fatal, this rudimentary condition can be observed only when particular casualties bring it under notice.

It is not intended to assert, by this observation, that a knowledge of the minute anatomy of the organs, either in their natural or diseased state, can reveal to us the essential nature of vital activity, natural or morbid. No matter how close may be our investigation, and to what extent we may proceed in a knowledge of the minute, still, as Burdach remarks, it is only the exterior side of life that we can discover. The interior remains concealed. The natural solids are, in fact, the products of the act of life: It terminates in them, and thus they pass, as it were, out of the domains of life. They must be removed and replaced by a new formation.

The pathological alterations of the organs, are, in like manner, the products of modified vital actions or morbid action, alone, or combined with deficiency or perversion of the constituent elements of the organized structure in the fluids. There is this difference, however, between natural and morbid products. When the morbid product is a new formation, it is not susceptible, for the most part, of removal as is the healthy structure. It remains permanent. If organized, it has the character of a new organic being, with an independent existence. It lives at the expense of the surrounding tissues, which it finally contaminates and destroys. If not organized, it then acts as a dead foreign body, a source of local irritation, and tends to perpetuate the action by which it was produced.

In neither case can be discerned more than the results of vital action. The nature of this action can be penetrated only by ideal analysis, commencing with the material; and,

the nearer we can approach to it in our physical investigation, the more probability of avoiding error, and of escaping wild hypotheses. Now, the commencing formation or product of natural or morbid vital activity, in the natural or morbid structure, brings us to the nearest possible point by which vital activity can be approached. Minute, molecular anatomy, natural and pathological, is then the proper starting place for that investigation.

The physical analysis of the organized structure, by anatomical research, being performed on the dead subject, partakes of the simpler character of the investigations in physics. There is no complexity of phenomena, arising from activity of force and movement, creating re-actions and confusing results. But these circumstances do attend on physical analysis, when carried into physiology. It loses its certainty. The subject to which it is applied, cannot be isolated, separated from all connexion, and no other phenomena than those attempted to be solved by the experiment, be produced or observed. On the contrary, in the living being an universal consent or connexion of one organ with another prevails. The different organs mutually act and re-act on each other, producing an intercommunity of phenomena, rendering experiments in physiology difficult and uncertain, and a hasty deduction from them hazardous.

The experiments in physiology are made by the mutilation of some organ, or by vivisections. It is not to be questioned, that many interesting facts have been developed, and numerous doubtful points in physiological inquiries been settled by these means. Yet, often the experiments performed are extremely cruel, the mutilation extensive, the organ to be examined so situated, that numerous others are involved. The results to be observed are no longer simple. The phenomena are diversified. There are profuse hemorrhage, excessive suffering, several important organic lesions perpetrated, with a shock to the whole system, prostrating its powers and destroying its functions, all operating together, producing varied and complicated phenomena difficult to separate and distinguish from each other. The reports of experimenters, as it respects the same experiment, are often in direct collision, and seldom correspond in all par-

ticulars. We can admit only as facts those phenomena that are observed in all the experiments performed; that are reproduced in each. They alone can be received as fairly established by the experiments. All others must be rejected as merely accidents.

In therapeutics, the direct actions of remedies on the organs is very little understood. Experiments, to a limited extent have been made to illustrate this important subject. But the analyses of the phenomena are not less difficult, from the diversified re-actions, and the incessant fluctuation of the sensibilities and forces of the organs, than in the more violent experiments of physiology.

Therapeutic experiments may be ranged under four heads. First, the exhibition of remedies to patients labouring under disease. This is the most common method pursued. But, that it is deficient in positive conclusions, is evident from the little information yielded, by centuries of observation, on the physiological actions of medicines administered in disease. Even the therapeutic effects are still obscure, doubtful, and constantly contested by different practitioners.

In disease, there is always great complication of phenomena. A new order of re-action, and of the sympathetic connexions of the organs, totally different from that of health, take place. The cases of different individuals in the same disease, differ in many material circumstances, owing to individual peculiarities. We cannot always determine from actions excited in health, that similar, or even analogous actions and operations, can be produced by the same means in disease; neither, can we be confident, that what we have accomplished in one case, we can, by the same proceedings, effect in another.

The economy itself is not idle in disease. It has processes of its own, organic re-actions, transmission of irritations, metastases, crises and critical evacuations by hemorrhage, or by secretion, from the bowels, skin, kidneys, lungs, &c., all of which are curative in their intention, and are directed by certain laws of the economy. Most, in fact, of the operations attempted by practitioners, are but imitations, and I fear, it must be said, too

often very bunglingly executed, of the processes of nature for the cure of disease. The more perfect this imitation is; the more closely the time and manner of exciting the various organic and functional operations, are copied from an observation of nature, the greater probability of success will attend on the treatment pursued.

Again, diseases have their regular laws, which they observe often with a strict fidelity. They pass through stages of limited duration. All diseases of re-action must come to a termination within a definite period, varying from twenty-four hours to several weeks, according to the particular nature of the disease. One stage of the disease is the initiative of the next that succeeds it, and generally determines its intensity. In a well organized individual, with good constitution, a disease, the first and second stages of which are regular in order, and the symptoms of which are within its natural line, must terminate favourably. The other stages, if not injudiciously interfered with, and sometimes even with this drawback, will pass through their natural course in progression, and the patient recover.

How difficult, then, must it be with these complex circumstances, to determine what is exclusively due to the natural recuperative operations of the economy, and what to the artificially excited operations of the medicine. Equal difficulty is experienced in determining with certainty, whether the favourable progress and termination of a case is to be attributed to the treatment, or to the natural course of the disease, uninfluenced and unretarded by the remedies that have been exhibited. The uninformed, the vulgar or ill-informed of medical practitioners, empirics of all kinds, draw no distinction between a recovery and a cure. There is a wide difference between the two. But, whether it be the half ounce dose of calomel, the drenching and incendiary stimulation of the Thompsonian, the leeching and barley water of the Broussaïans, the eternal purgative pill of the Morrisonian, or the nonentity of the Homœopathic dose that have been employed, when the disease takes a favourable course, each exclaims, a cure accomplished by my remedy, by my treatment! Should the reverse occur, it is never the

intemperate proceedings, the extreme debilitation, the irrational one mode of acting for all circumstances, the absolute inefficiency of imaginary doses, abandoning the economy, when it requires the assistance of instructed skill and art from the feebleness of its powers, to sink in an unequal struggle; it is none of these that are, then, accused of the untoward event. Nature or the disease, are always saddled with unfavourable results. The doctor and his remedy invariably claim all that is favourable. With observers of this character, can it ever be expected that truth will be elicited? With this method of reasoning and observing, or rather absence of method, how is it possible ever to determine the physiological actions of remedies, or their therapeutic value in the treatment of disease!

The following instance corroborates strongly the position, that the administration of remedies in disease is an uncertain mode of determining their effects. The late celebrated Doctor Fothergill, of London, declared, that after forty years' experience, he had found no febrifuge equal to the diaphoretic antimony, administered in small doses. Now, this preparation is a peroxide of antimony, and is absolutely inert. It may be taken in large quantities with no more effect, than any other inert matter. It has been rejected by all the Colleges from their Pharmacopœias. Here is an instance of false experience, and an evidence of the liability to be deceived, as respects the actions of remedies, administered in disease. Numerous illustrations could be adduced, from the history of the materia medica and therapeutics, to sustain this view, but they would occupy more time than is at our disposal.

The exhibition of medicine to persons in health, is a second method that has, of late years, been resorted to in order to ascertain the effects they produce, or their mode of action. *Joerg* and his associates, *Andral* and others, have made experiments of this kind. This method is as yet too novel to have been very fruitful in the facts it has yielded. This line of investigation is calculated to throw a strong light on this obscure subject, and deserves to be further prosecuted. Many remedies in their therapeutic dose, produce positive symptoms that careful obser-

vation can determine. There are, however, many others whose immediate influences are too obscure to be appreciated. It is perhaps impossible to determine by this method the alterative actions of remedies.

A third method, is experiments on animals. Useful facts may be obtained in this manner, but the vitality and sensibility of similar organs in animals and man are not the same. Hence caution is necessary in the inferences to be drawn.

A last method, consists in the facts derived from the effects of poisoning doses of medicine. Very little useful information, it appears to me, is derived from this source. There is no analogy between a poisoning, or destructive action, and a therapeutic or curative action. From the poisoning by arsenic, we cannot understand the mode of action, by which, in therapeutic doses, it so frequently accomplishes cures of diseases, rebellious to all other means. From the saturation of the economy by mercury, and its poisonous effects on the tissues, no inferences can be drawn as to its therapeutic actions in alterative doses, or in its minimum doses, in calming the irritation of the stomach in cholera infantum and other affections. The therapeutic action can seldom, if ever, be demonstrated by the poisoning action of a medicine.

It is in the preceding subjects of investigation, that physical analysis or experiments, have been resorted to with more or less success, for the demonstration of the facts of medical science. Mental analysis or abstraction, embraces a wider range and more elevated order of phenomena, connected with the physiological sciences. By this operation of the intellect, phenomena, incapable of physical examination, are traced up to their origin; they are combined in the order of their occurrence; their relations and differences established; and, when possible, their nature determined. Applied to anatomical science, it has produced general, philosophical and transcendental anatomy. In physiology, the nature and production of the functional, and of the organic actions; the laws that regulate them; the mode of production, nature, and modifications of vital re-action, whence result the varied phenomena of vitality, are principally investi-

gated by mental analysis. The higher questions of pathology, general and special; and of therapeutics, in like manner, can for the most part, be investigated only by mental abstraction, observing always the analytical method.

The introduction of the analytical method of research into medicine, is the work of the present epoch. It has banished, almost entirely, hypothetical discussions, formerly so prevalent, from the science, and is daily approaching it more nearly to the positive sciences.

VI. Argument, as it is in the power of most persons, is constantly resorted to for the purpose of producing conviction or establishing facts. It is often mistaken and substituted for demonstration. An argument is the train of thought or combination of ideas, by which an opinion is supported or attempted to be proved.

Demonstration is the evidence or proof, by investigation of the facts, obtained by research, observation, or experiment; and which renders clear the truth of an opinion, principle, or question to be settled. An argument may be, but seldom is a demonstration. An ingenious mind can arrange an argument on any subject, and on either side of it. Examples of this are furnished daily in our courts of law, legislative and other debating bodies. I believe it very probable that an argument seldom has produced a conviction on the mind, or ever established a truth. During every session of Congress, and the different Legislatures, arguments of the highest order, possessing the weight of great intellectual powers, are continued for days and weeks without influencing a single individual in his vote. Before the question is brought up, and the argument commenced, the result is known; every vote can be counted on all leading questions. This determination is never shaken by an argument. A demonstration cannot be resisted with this pertinacity of purpose. There can be no more pregnant example of the futility of argument, as a means of advancing knowledge, of investigating truth, or enforcing honest principles.

VII. Tabulation and enumeration. It is not sufficient that we acquire knowledge, and make observations and experiments.

The knowledge acquired, the facts and phenomena established, should not be trusted to the treachery of memory, but, at once be recorded, and arranged in a manner that will exhibit them in their natural relations. Tables, properly arranged, offer the best means of accomplishing this end. In the formation of these tables, all phenomena of the same species, order, and class, should be placed under their respective heads. In all complex subjects and questions, by breaking them down to their constituent phenomena, and arranging each separate phenomenon or fact in its respective column, by summing up the table, we find the phenomena or facts that are universal, and consequently essential; and those occasional only, and of course accidental. From the class, to which the facts belong, we learn, also, what phenomena are the most important of the series, or of the combination.

In medical observations, this method is the best calculated to unravel the entanglement of the phenomena existing in disease, and to present to the mind each one in its single state, and its just position and relation to others, or the whole. In any disease, for example, if the causes, and the symptoms as expressed in the general functions; and the lesions, as detected in the tissues and organs after death, are each recorded under its proper head in a table; when this has been done for two or three hundred cases, the numerical addition of each column, will give the relative frequency with which they occur. Those that are rare, occurring in a limited number of cases, are mere accidents, connected with some peculiarity of the patient. They do not necessarily belong to the disease—are not part of it. Those, on the other hand, that are found in every case, or in the great majority, are essential to the disease; those are the phenomena that are to be taken into consideration, and that should govern our conclusions.

Similar tables, embracing all the circumstances of the origin, progress, treatment and termination of cases, will present the facts of disease in a positive character, and strip them of the obscurity, confusion, and uncertainty in which they now exist in most pathological and practical works.

The numerical method, as this plan has been named, was introduced a few years past, by M. Louis, of Paris. Its merits have been the subjects of considerable discussion. It has its advocates and its enemies. It is extolled extravagantly by some, unjustly depreciated by others. It will not complete medicine; it is not applicable to or capable of solving all the subjects and inquiries embraced in the history of disease. But this method will render most complete and satisfactory the statistics of disease; and thus lay that broad and solid foundation that has never yet been done, on which the structure of medical science can be durably erected.

This method of M. Louis is further, a noble defence, protecting medical science against the inroads of its worst enemy: a wild spirit of hypothesis, that has heretofore spread a baneful influence over its fair regions. Writers, in order to command attention, must now use the language of strict observation, and all their theoretical inductions be the legitimate results of well arranged facts, established in the clearest manner; or they will not be listened to.

The numerical method is incorporated in medicine, as "a part and parcel" of the science.

VIII. The last method of acquiring knowledge and of forming opinions, is by generalization. This is an intellectual operation, by which all the facts or phenomena of the same kind, or that form a series, are condensed, as it were, into and is expressed and represented by one general fact or phenomenon. Thus, gravity expresses the general fact or phenomenon, that all ponderable bodies tend to the centre of the earth, regulated by specific laws, and is the cause of the fall of bodies. Now, this general fact is established by numerous separate and distinct facts. Sir Isaac Newton first made the generalization, and, as the story goes, his mind was led to the train of investigation which resulted in its discovery, by the fall of an apple on his head. All the world had seen bodies fall, but none before Newton had been able to generalize the facts observed, and establish the principles and laws governing this common phenomenon.

The same observations are applicable to affinity, attraction,

magnetism, caloric, electricity, all of which are generalizations of numerous particular phenomena, expressed by one comprehensive phenomenon, in which they are included.

Generalization is a most difficult operation of the mind, and much exposed to error. In the mathematical and physical sciences, where calculations and diagrams can be resorted to, generalization is a safe proceeding. But in metaphysical, moral, and political science, there is scarcely a single generalization that can be trusted. They all contain a mass of error. In medical science, generalization is, equally, if not more hazardous. Few that have been, and that continue to be formed are worthy of confidence. The facts of medicine have not as yet been proved with that severity of observation, and arranged in their appropriate order with that degree of justness, which can alone enable a generalization to be made free of error. There are few of the generalizations of medicine, theoretical or practical, that should not be regarded with the greatest distrust. There is not a practical precept, so absolutely established, as to be concurred in by all the practitioners of the same country or city, not to speak of those of different countries. No general theory of medicine has yet been proposed that has survived to the present time: and most have expired in the period that gave them birth. Every generalization of the kind has assumed, that the animal economy was an unit, either as to its structure and its forces, or as to both. Now, the progress of our knowledge of the organization has shown, that it is in the highest degree complex. To say nothing of the fluids, no two tissues or organs are similar. They differ in every particular; as to chemical composition, as to organic structure, as to organic forces, sensibility, irritability, or mode of vitality: as to functions, as to importance in the economy, as to relations with each other and with exterior agents. Each organ is a distinct, subordinate organization; a species of zoonite or inferior animal. They are made to depend on each other, and to concur to their mutual existence and actions. There is thus co-ordination, confederation, union of distinct special organizations with distinct special powers and offices, the whole regulated and controlled by general governing

forces. The animal organization represents unity embracing complexity: no general theory can embrace and explain the endless diversity of phenomena thus arising, by a single principle. In medicine, instead of looking for a simple and single theory, we must expect and look for numerous theories: for the organs, in their healthy and in their morbid states, are so different from each other, that each requires a separate study and rationale of its phenomena. Theories, or the development of the laws observed in diseases that are independent of local lesions, must be as distinct from each other as are the diseases themselves. When these generalizations cannot be made with a strictly logical method, it is better to remain contented with a rational empiricism, based on rigid observation, furnished and daily corrected by clinical instruction. For this purpose, hospitals placed at the command of the profession, are indispensable to the improvement and perfection of medical science. The want pressing on our science, each day becoming more and more imperative, is hospitals, devoted to clinical instruction and the observation of disease. The public having the deepest stake—their healths, and lives—in the advance of medicine, are bound, and are loudly called on, to remedy this serious, I may say, discreditable deficiency, in the scientific instruction of our country.

I have now, gentlemen, laid before you the different methods, with their respective advantages and defects, by which knowledge is acquired and rendered accurate; by which sound and judicious opinions are formed; by which truth is to be sifted and separated from error.

You must have perceived in the course of this examination, how difficult is the acquisition of knowledge; how obscured and deeply hidden from the view, is truth! They are to be obtained only by severe application and labour. In devoting yourselves to the study of medicine, you have commenced a life of unceasing toil. The questions it opens for investigation, place it within the domain of the highest philosophy. Its practical application involves the deepest, often the most fearful responsibilities. Be not discouraged at the prospect that lies before you. There is brightness as well as gloom. Let this consideration spur you on

to exertion. In human affairs, nothing worth possessing is of easy attainment. The labour necessary to production or acquirement, is the cause of and imparts value. There is no difficulty that will not yield to application. No obstacle that perseverance will not remove. No prize that industry may not gain. Reputation never was and never can be obtained by accident. A quack, in any profession, may have a temporary fame with the vulgar, literate or illiterate; but it soon sinks in disgrace, and disappears overwhelmed with dishonour. A man of science may, for a time, remain obscure and unknown, but his name and reputation cannot continue in oblivion. It is in the order of nature, that whatever is endowed with innate living force and fire, shall emerge into light; and that name, though it may for a time, be unknown, must arise from its obscurity, as the star from beneath the dark horizon, until it reaches its appropriate sphere.

There is no reputation more worthy of an honourable ambition, than that of a gifted, instructed, and conscientious physician. In the physical and barbarous state of society which, though gilded by a more refined civilization, has not yet terminated, medicine, with all the intellectual pursuits, was placed in the gradations of society beneath its level. The strong arm for destruction and plunder, had more honour than the head and the heart devoted to the alleviation and succour of suffering humanity. As society advances to its loftier destinies, entering on its period of intellectual and moral ascendancy, the medical profession, freed from the mass of quackery and imposition, that a blinded community suffers to degrade it, will rank with the most elevated. The first of poets, ages past, recognised and did justice to its eminent science and lofty character. Time serves to confirm its truth.

“A good physician, skilled our wounds to heal,
Is more than armies to the public weal.”—*ILIAD*.

